

## OCULAR ABNORMALITIES OF CHEETAHS EXAMINED AT AFRICAT

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### Introduction

Over the past years a number of cheetahs in Namibia have been examined ophthalmologically. Equipment used during this examination included a slit lamp biomicroscope, indirect and direct ophthalmoscope, Schiotz tonometer, fluorescein stain and gonioscopy lens. The animals were anaesthetised for the annual health checks at Africat in Namibia, or were examined at the time of presentation for blindness. A high incidence of ocular trauma ranging from mild scarring of the lids and/or cornea, through to mature cataracts, severe endophthalmitis and phthisis bulbi was found. It is theorised that this is as a result of the cheetah being forced to hunt in bush-encroached areas – a habitat not ideally suited to the hunting methods of the cheetah. Blindness or severe visual impairment spells death for a wild cheetah, and could thus impact greatly on the sustainability of the wild cheetah population of Namibia.

In 1997, four cheetahs were presented for ocular examination and assessment of visual status as these animals were presumed to be blind. Two were adult animals found in the wild in poor physical health and on the brink of death (one old male of unknown age, and one adult female, also of unknown age, with three six-week old cubs at foot), while the other two were young animals approximately one year old that had been born in captivity and hand raised. The two young animals were found to have bilateral mature cataracts with no signs of any other ocular defects. These cataracts were assumed to be either of congenital or nutritional origin. The adult animals were found to have severe signs of ocular trauma, including lid and nictitans scars, penetrating scar tracts of the cornea, severe synechiation and mature cataracts. In the female, foreign bodies were found in the cornea of one eye (two thorn tips), with the presence of severe uveitis in this eye. These animals, following appropriate care and treatment, all underwent successful cataract extraction surgery by phacoemulsification lensectomy technique. These findings prompted an investigation into the cause of the cataracts in adult wild-caught animals to try to ascertain whether the ocular trauma was secondary to the visual deficits present as a result of the cataracts.

### Animals Examined

In Namibia captive large carnivores have to undergo an annual health check. There are a number of rehabilitation centres such as Africat where problem cheetahs caught in the wild, as well as orphaned cheetahs, are kept, nursed to health, and eventually relocated to safer environs. Most of the animals reported in this study were examined during the annual health check.

### Examination method

The veterinarian tasked with immobilising and maintaining anaesthesia of these patients used the Hellabrun mixture, Ketamine/Xylazine mixture or Zoletil. The former two choices of drug provided excellent forward fixation of the eyes, with normal to mydriatic pupils allowing for good examination of all the ocular structures. Prior to application of any lubrication ointment to the corneas, the cheetahs were moved to a darkened room for the ophthalmic examination. They were positioned in sternal recumbency with a support under the chin to align the eyes with those of the examiner. The examination was performed using a slit lamp biomicroscope for assessment of the external ocular structures as well as the cornea, anterior chamber, iris, lens and anterior vitreous. An indirect ophthalmoscope with a 25D lens was used to examine the fundus. Direct ophthalmoscopy, as well as tonometry and gonioscopy were performed where indicated and did not form part of the routine ophthalmic examination. Following full ophthalmological examination, the eyes were treated with an ocular lubricant to prevent desiccation of the cornea. Any fresh corneal or other ocular injuries were treated appropriately.

### Recording of findings

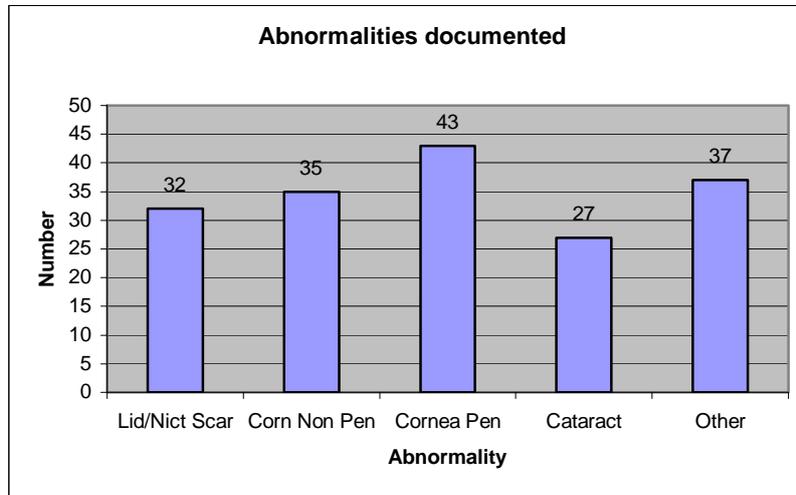
A scribe was responsible for recording the ophthalmic abnormalities noted in the various segments of the cheetah eye, as dictated by the ophthalmologist. The findings were then grouped into abnormalities of the lids, including the nictitans, the cornea, the lens and other. Abnormalities listed under other included those of the iris, vitreous and retina.

The table below indicates which abnormalities were detected under each of the various anatomical structures of the eye:

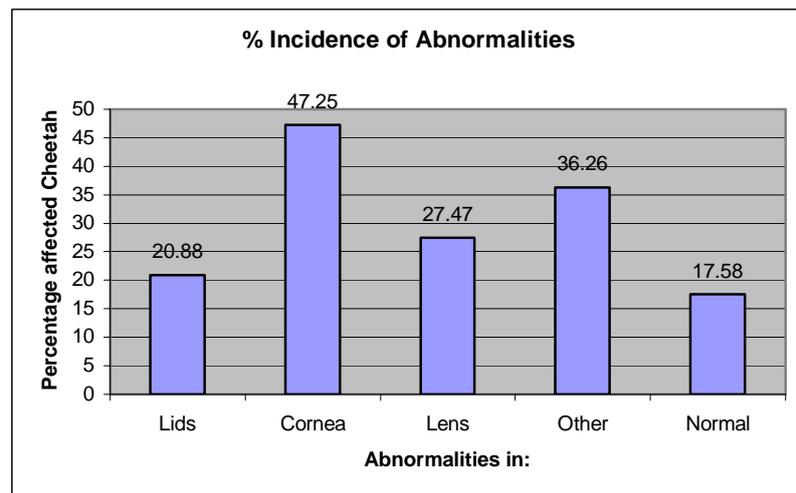
Structure	Abnormality Documented	
Lids	Scars Discontinuity of lid margin Laceration of nictitans Distichiasis Foreign body	
Cornea	Blood vessel in-growth Crystallisation Pigmentation Non-penetrating scar Subepithelial, mid-stromal or deep-stromal scar Penetrating scar with endothelial damage	
Lens / Cataract	Anterior capsular Anterior cortical Nuclear Posterior cortical Posterior capsular Immature Mature Posterior synechium	
Other	Iris	Persistent pupillary membranes Foreign body in iris Posterior Synechiae Iris freckle
	Retina	Horizontal stripe above optic nerve Retinal scar Retinal folds Tapetal radial striations
	Strabismus	
	Inflammation	Uveitis Conjunctivitis Keratitis
	Phthisis Bulbi	

## Results

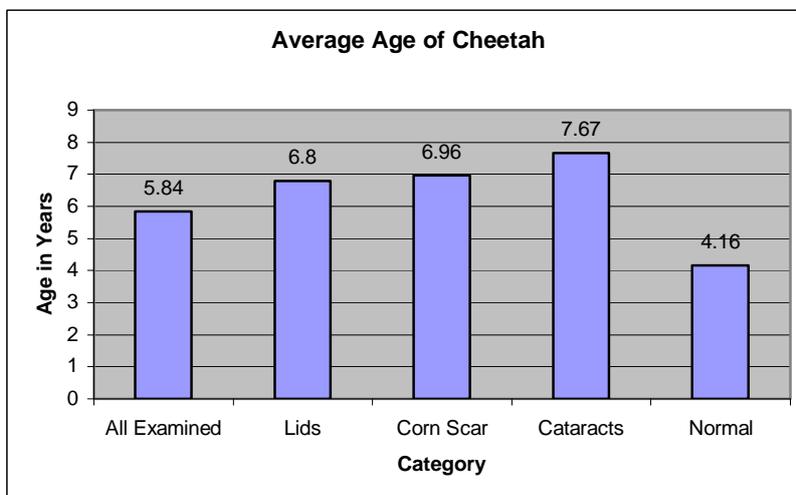
Graph 1: Total number of abnormalities documented in the first 182 eyes examined.



Graph 2: Percentage of abnormal findings in the various anatomical structures.



Graph 3: Average age of cheetahs at time of examination



### Conclusion

It was shown beyond doubt in this study that there is a high incidence of ocular trauma in wild free-living cheetahs in Namibia. This trauma was as a result of thorn or foliage damage to the lids, nictitans and cornea - the latter being the most significant, as there was a high incidence of evidence of penetrating corneal injury leading to either uveitis with secondary cataract formation, or direct damage of the anterior capsule of the lens with posterior synechiae formation and cataracts.

It is of concern that the incidence, severity and consequences of ocular trauma is of such a nature that it could impact severely on the longevity of a cheetah in a bush-encroached environment. As similar incidences of ocular trauma are not found in lion and leopard populations in the preliminary studies done, and because these cats generally live in thicker bush habitat than the cheetah, it is surmised that factors are present which are adversely affecting the health of the cheetah's eyes in the wild. It is proposed from this study that the anatomy of the cheetah's skull, its large forward-facing exposed eyes, its body designed for speed rather than stealth hunting and its habit of hunting predominantly during the day, make it the ideal hunter for open grassland or plains. As the cheetah in Namibia is being restricted to overgrazed, bush-encroached areas, it is forced to hunt in this type of vegetation, leading to the high incidence of ocular trauma encountered.

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### Photographs of examination and findings:

	Laceration on edge of Nictitans (third eyelid)
	Thorn stuck in iris of left eye
	Slit Lamp Biomicroscopy

	Hyperplastic follicles on inner surface of the nictitans (third eyelid)
	Iris freckles
	Large posterior synechium
	Laceration on edge of Nictitans (third eyelid)
	Large anterior cortical cataract

	Large anterior cortical cataract
	Large laceration on edge of nictitans (third eyelid)
	Large anterior cortical cataract
	Large iris freckle